

# New Zealand National Report 2002

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## Overview

New Zealand's glaciological research in the Antarctic is conducted through a series of small to medium-sized field-based research projects supported logistically by *Antarctica New Zealand*, the national Antarctic programme. The science is funded by a range of agencies, including universities and government science funding agencies, and involves national and international collaboration. Smaller projects generally focus on terrestrial glaciology or glacial geomorphology/geology, and are led by university-based researchers. The largest project deals with sea ice, and is conducted by a consortium of researchers led by a scientist working in a government institute. Some geological projects have glaciological dimensions, through their examination of glacial history at various scales.

At present, there is no unified national glaciological research programme, although there are some strong linkages between researchers. A recent central government initiative to establish a series of centers of research excellence may enhance these linkages. A proposal was submitted in December 2001 to establish an Antarctic centre of research excellence based at the University of Canterbury in Christchurch that included a significant glaciological component, and that would have provided a clear pathway for developing a more unified programme of glaciological research. This proposal has been unsuccessful to date, although work is ongoing with respect to funding the proposed research.

Overall, the level of activity in glaciology in the New Zealand programme is relatively small, and most of the projects are relatively small-scale.

## Summary of activity

Activity is summarised by theme of study, differentiated between 'process studies' and 'history studies'.

### Process studies

- The largest glaciology project is a sea ice processes project (PI: Tim Haskell, Industrial Research Limited). This ongoing project in the last two seasons has focused on addressing two main objectives, being the properties of faults in sea ice,

and wave/sea ice/climate linkages. The Otago University collaborators of this project (Vernon Squire *et al.*) are hosting the IAHR Symposium in Ice in December 2002, and the IGS Symposium on Sea Ice in 2005.

- A project examining erosion processes in cold-based glaciers (PI Sean Fitsimons, University of Otago) has continued at glaciers in the Dry Valleys, involving amongst other things measurements of deformation and velocity in subglacial tunnels. The results of this project suggest that a wider range of erosion/entrainment processes operates at the bed of cold glaciers than previously thought.
- A project on the dynamics of the Taylor Glacier in the Dry Valleys (PI Wendy Lawson, University of Canterbury) continues, although this project has not necessitated field work in the last 2 seasons.

## **History studies**

A series of projects using a wide range of techniques address glacial history at various spatial and temporal scales. These projects are essentially geological in scope rather than glaciological, but they address some important issues related to ice sheet history:

- The history of the Rennick Glacier area in North Victoria Land is being investigated (PI: Paul Augustinus, University of Auckland) using cosmogenic dating of glacially-eroded surfaces. Results to date indicate that the glacier has a complex history, sensitively linked to sea level.
- The chronology and nature of the history of the EAIS is also being investigated in the Allan Hills area (PI: Peter Barrett, Victoria University), using sedimentological approaches.
- In the Victoria Valley, shallow ice and firn cores are being used to examine Holocene climate history along a valley transect (PI: Nancy Bertler, Victoria University). This project obtained a 280 m long core in 2001/2002 from the coastal Victoria Lower Glacier that will provide a climate record of the last 8000-10000 years.
- Shallow drilling of permafrost is being used to examine climate and landscape history in the Dry Valleys, and also to develop a model for the origin of soil moisture (PI: Warren Dickinson, Victoria University). Results indicate that the moisture is derived from atmospheric condensation.
- The international ANDRILL project (NZ PI: Tim Naish, Institute of geological and Nuclear Sciences) has conducted site selection seismic work in the last 2 seasons, in preparation for sub-ice shelf drilling beginning in 2004/2005 to explore EAIS history

## **Links to SCAR programmes**

New Zealand's Antarctic glaciological research is variably linked in to SCAR programmes. The sea ice work is closely linked in to the ASPeCT programme, and one of the key project researcher (Vernon Squire, Otago University) is a member of the ASPeCT Scientific Steering Group.

The history studies are linked in to a variety of SCAR programmes through the Geosciences working group.

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